Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

MUSCALE BUTTONS.

By L. E. Sayre and A. E. Stevenson.

SOME TIME ago a missionary from one of the northern states sent to the writer a communication in which he referred to what was known as the "meschale eaters." The writer of the letter, whose name is purposely withheld, spoke of the product as a plant coming from Mexico, and stated that the effect of the plant was something like that of cocaine. The writer was asked to investigate the product and to determine what the article contained to produce such an effect.

A large sample of the article was finally obtained, which proved to be the muscale buttons. These grow in the arid hills along the Rio Grande and southward into Mexico. It is a small cactus (*Lophophora*), which is popularly known as "peyote." It is still used in ceremonies and for medicinal purposes by the Indian tribes between the Rocky Mountains and the Gulf of Mexico, from the Arkansas river southward. Among the white people the buttons are commonly known as "mescal," owing to a confusion with the maguey cactus of the southwest, from which latter the intoxicant known as mescal is prepared. The peyote plant resembles a radish in shape and size, and only the top appears above the ground. From the center springs a beautiful white blossom; the latter gives place to a top of white down. To the north of the Rio Grande this top alone is used, and when sliced and dried it forms the so-called button. In Mexico the whole plant is cut into slices, dried, and used as a decoction and in their ceremonies.

Mr. I. R. Geare has communicated a valuable contribution on this subject—"The Consumption of Peyote Among the Indians"—in the May issue of Merck's Reports, New York, 1913. In speaking of the ceremony he makes the following statement:

"The peyote ceremony is usually performed as an invocation for the recovery of the sick, and the chief feature of it among the Mexican Indians is a dance, while among the Kiowas, Comanches and other 'plains' tribes it is rather a ceremony of prayer and contemplation. The ceremony is held in a tipi especially erected for the purpose, and generally lasts all night. Women do not, as a rule, take part in the ceremony, but are occupied in preparing the sacred food as well as the feast, in which latter all join at the close of the ceremony. A fire is kept burning in the

center of the tipi, the men sitting around it. The fire is enclosed in a crescent-shaped mound, on the top of which is placed the sacred peyote. Following an opening prayer, each participant receives, chews and swallows four peyotes, after which the sacred songs begin, with accompaniment of drum and rattle. Each man, in turn, sings four songs, and the singing is kept up all night, varied by intervals of prayer and other distributions of peyote. At midnight a kind of a baptismal service takes place. The number of 'buttons' eaten by each individual during the night is from ten to forty or more. The drug produces a kind of spiritual exaltation, said to be different from that of any other drug, and without any reaction. During the ceremony the sick person to be prayed for is brought in, and he is allowed to eat one or more specially consecrated 'buttons.' When daylight comes the morning-star song is sung. The women then pass around the sacred food and the ceremony ends with the 'meat song.' After a season of friendly talk, followed by a dinner, the participants disperse."

In order to investigate the toxicity of the buttons, which were sent us as authentic material, 200 grammes of the powdered buttons were extracted by suitable solvents in order to remove all the physiological activity from the fibrous material. The solution thus obtained was purified repeatedly by the use of immiscible solvents, such as chloroform, ether, etc., until the solution was practically free from inert material and contained the active principles in the most concentrated form. Only a few milligrammes of the concentrated extractive were obtained from 200 grammes of the drug. Hence this was extremely concentrated.

The method of Heffter for separating the principles thus far isolated from the buttons is as follows:

The coarsely powdered drug is digested several times with 70 per cent alcohol. The alcohol is distilled from the united extracts, filtered to separate resinous material, then made alkaline with ammonia and shaken out with chloroform. The alkaloids are then extracted from the chloroform solution with diluted sulphuric acid, the alkaloid precipitated with ammonia, and the precipitated alkaloids treated with ether, which dissolved "anhalonin," "pellotin" and "lophophorin," while "meycalin," "anhalonidin" and "anhalamin" remain. The insoluble alkaloids are converted to sulphates and crystallized. The first crystallization product consists principally of meycalin sulphate, from which meycalin can be separated by making alkaline, shaking out with chloroform and recrystallizing. Anhalondidin is separated and purified with difficulty, but can be

obtained by formation of the platinum salt which is difficultly soluble in water, or by treatment of the hydrochlorides with alcohol. The hydrochloride of anhalonin is precipitated when a solution, in absolute alcohol, of the alkaloids insoluble in ether is neutralized with HCl. This principle is said to be strongly poisonous and produces effects similar to those of strychnine. Lophophorin remains in the mother liquor of the hydrochlorides of the alkaloids insoluble in ether, from which it may be separated. It has not been obtained in pure condition, but only in the form of a colorless syrup.

PHYSIOLOGICAL TESTS.

USING THE ABOVE CONCENTRATED EXTRACTIVE MADE BY OURSELVES.

The object of the investigation being only to determine the toxicity of the drug and to locate its relationship to other known poisons, it was only necessary to make a few experiments upon the lower animals, such as frogs and guinea pigs.

A solution was made of the concentrated extract representing the mixed poisonous products of the drug of the strength of 8 mm. to the cc. This solution was sent over to the Pharmacological Laboratory to Doctor S. A. Mathews, with a request for a report upon the toxicity of the substances, and, if possible, to get a report upon its relation, if any, to other known poisons. Doctor Mathews reports that one-fourth of a cubic centimeter, representing 2 mm. of this extractive, put a frog into tetanus spasms almost immediately, and the action upon the frog was practically identical with that of strychnine.

One of the principles which has been isolated from this drug and the structural formula for it are as follows:

Mescaline: C_6H_2 $CH_2(NH)(CH_3)$ 1, OCH_3 3, OCH_3 4, OCH_3 5

Our object will be, in the future, to obtain a large quantity of the buttons and endeavor to separate its various constituents.